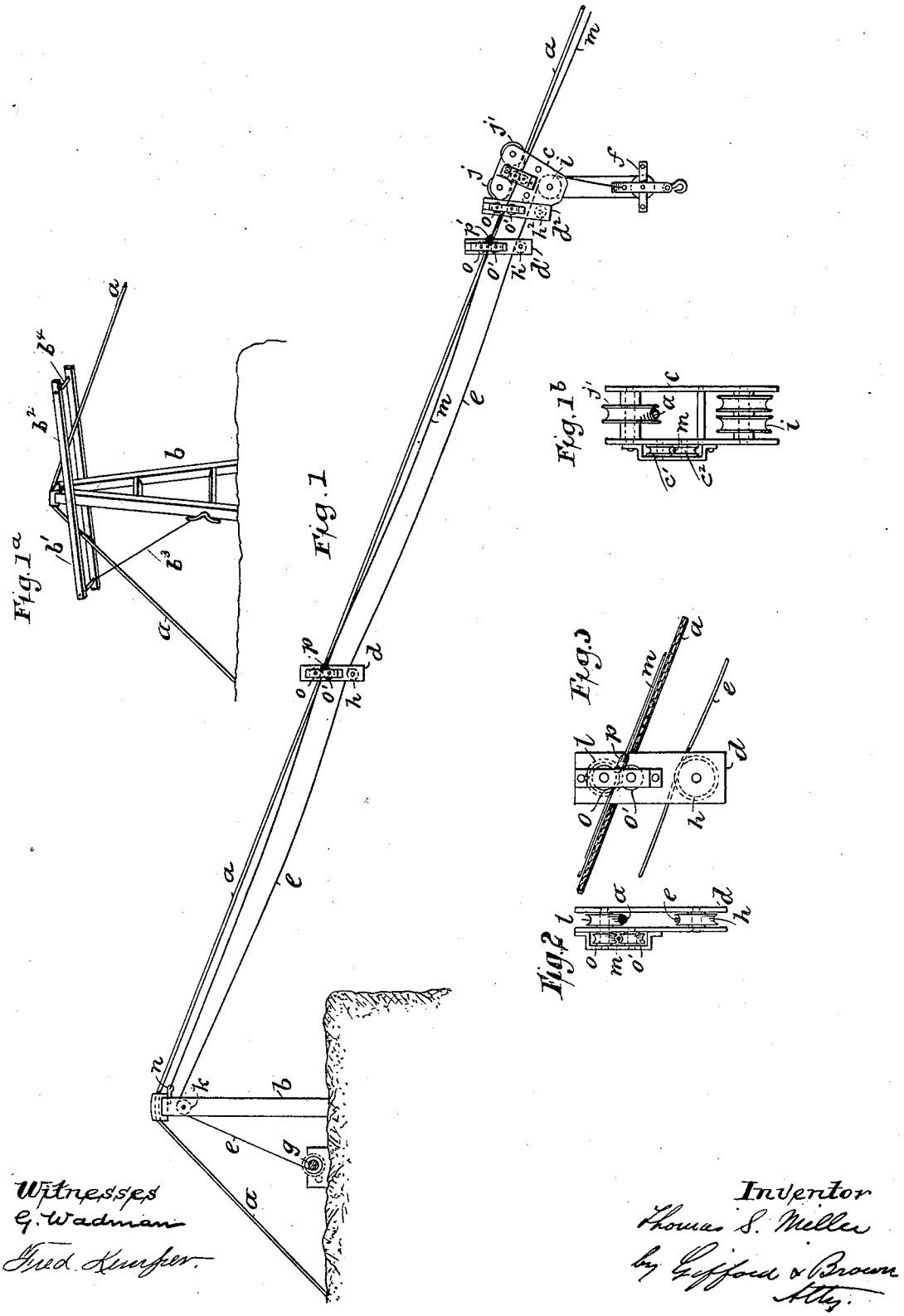
(No Model.) 2 Sheets—Sheet 1.

T. S. MILLER.

CABLE HOISTING AND CONVEYING MACHINERY.

No. 434,550. Patented Aug. 19, 1890.



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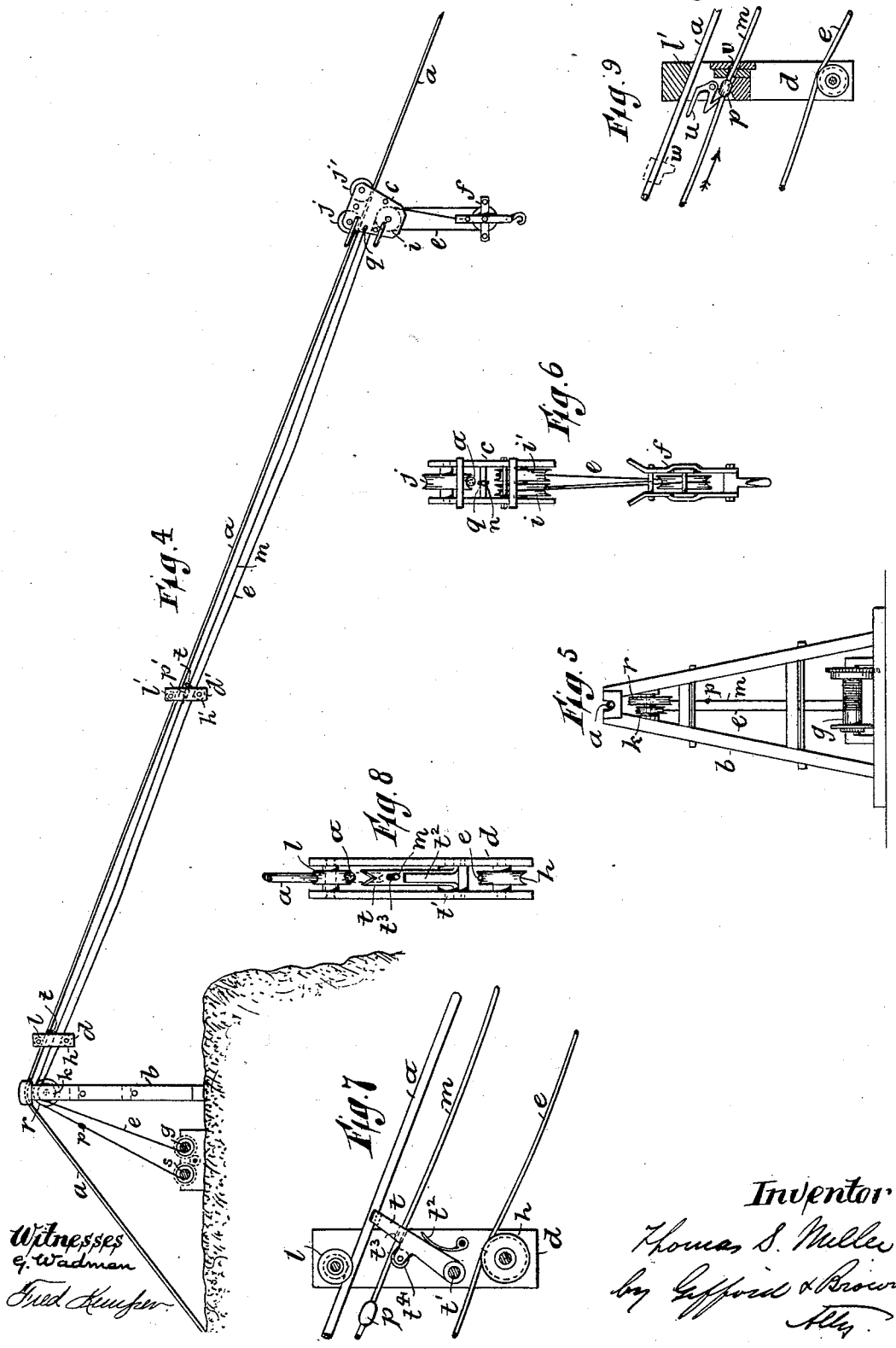

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THOMAS SPENCER MILLER, OF NEW YORK, N. Y.

CABLE HOISTING AND CONVEYING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 434,550, dated August 19, 1890.

Application filed April 17, 1890. Serial No. 348,304. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, of New York, in the county and State of New York, have invented a new and useful Improvement in Cable Hoisting and Conveying Machinery, of which the following is a specification.

This improvement relates to the general class of apparatus, a form of which is shown in Letters Patent of the United States, No. 295,776, dated March 25, 1884, to M. W. Locke, in which the fall-rope is supported upon fall-rope carriers.

One part of my invention relates to the means by which I control the movements of these fall-rope carriers. Another part of my invention relates to the combination, with the fall-rope, of a rope secured to the main carriage, by which the position of the main carriage may be controlled independently of the fall-rope.

In the drawings which I am about to describe I have shown certain forms of construction embodying my invention; but I do not desire to limit myself to the particular form shown or described.

Figure 1 shows a cable and carriage having one form of my invention applied thereto. Figs. 1^a and 1^b show details of the same. Figs. 2 and 3 show details thereof. Fig. 4 shows a cable having another form of my invention applied thereto. Figs. 5 and 6 are details thereof. Figs. 7 and 8 are details showing one form of mechanism which may be employed in the fall-rope carriers. Fig. 9 shows another form of mechanism which may be employed in the fall-rope carriers.

In all of the figures, *a* is a cable. *b* is the tower supporting the same at one end.

c is the main carriage.

d d' d² are fall-rope carriers.

e is the fall-rope.

f is the tackle or fall-block suspended by the fall-rope.

g is the drum actuated by suitable power, upon which the fall-rope is wound.

h h' h² are the sheave-wheels journaled in the fall-rope carriers, over which the fall-rope runs.

i i' are the sheave-wheels in the main carriage, over which the fall-rope runs.

j j' are the wheels journaled in the main carriage and running on the cable.

k is a sheave-wheel journaled in the tower, over which the fall-rope runs.

l l' are wheels journaled in the fall-rope carriers, which run on the cable.

m is an auxiliary rope, the function of which is to control the positions of the fall-rope carriers. This rope is differently disposed in Figs. 1 and 4, and I will first describe the disposition of it as shown in Fig. 1. The auxiliary rope *m* is attached at one end to the tower at *n*, and is similarly attached to the tower or anchorage at the opposite end of the cable, extending parallel, or nearly so, with the cable.

Each of the fall-rope carriers is provided with a pair of sheave-wheels *o o'*, arranged, as shown in Fig. 2, so that the auxiliary rope *m* passes between them. Now, the cable *a* being on an incline, as the main carriage runs down the incline the tendency of all of the fall-rope carriers will be to run down along with it; but it is necessary that they should be stopped at such distances apart as to properly support the fall-rope. For this purpose buttons *p p'*, shaped somewhat similar to an egg, are fixed to the auxiliary rope *m* at the required distances apart, such buttons increasing in size from the top to the bottom of the incline. The sheave-wheels *o o'* of the fall-rope carrier *d* nearest the upper end of the incline are placed so close together that the button *p* nearest the upper end of the incline cannot pass between them. Therefore that button will stop and prevent the further descent of the fall-rope carrier *d*. The sheave-wheels *o o'* of the next fall-rope carrier *d'* are farther apart, so as to admit of the first button *p* passing between them; but they are not so far apart as to admit of the larger button *p'* passing between them, and therefore the fall-rope carrier *d'* will run by the button *p*, but will be stopped by the button *p'*. In the fall-rope carrier *d²* the sheave-wheels *o o'* are placed still farther apart, so as to admit of the passage between them of the first and second buttons in the series, but to be stopped by the third button. Thus each succeeding fall-rope carrier admits of the passage of an additional one of the buttons, and thus when the main

carriage has descended to the bottom of the incline the several fall-rope carriers will be strung out along the fall-rope at stated distances apart determined by the position of the several buttons. As soon as the main carriage has reached the bottom of the incline, or to a stop secured to the main cable, the tackle-block f will descend as the fall-rope is run off of the drum g, and the descent of the tackle-block under these circumstances will not be interfered with materially by the weight of that portion of the fall-rope intervening between the tower and the main carriage, because such weight will be borne by the fall-rope carriers.

When a load is to be hauled up the incline, the drum is started to haul in the fall-rope. The first effect of this will be to pull the tackle-block f up to the main carriage. Then the main carriage will be pulled up the incline and will push ahead of it the various fall-rope carriers until it has collected them all at the top of the incline, where they may be held by any suitable device, such as the frame $b' b^2$. (Shown in Fig. 1ª.) This frame is pivoted to the tower b, so that the end b^2 overbalances the end b'. The end b' is held down by the rope b^3, so as to raise the end b^2 high enough to allow the rope-carriers and main carriage to pass under the cross-piece b^4. By thus loosening the rope b^3 the cross-piece b^4 will drop down onto the cable and prevent the carriers and carriage from running down the incline until it is raised again by tightening the rope b^3.

The rope m may be compelled to occupy a fixed position relatively to the carriage undisturbed by the sagging of the cable by passing between the sheaves $c' c^2$, journaled on the side of the carriage, as shown in Fig. 1ᵇ.

I will next describe the construction shown in Fig. 4. Here the auxiliary rope m is connected at one end, as at q, with the main carriage c, whence it extends substantially parallel with the cable a over the sheave r to an auxiliary drum s, which is provided with suitable power to be moved in unison with the drum g, or stopped, if and as required. The auxiliary rope is here, as in the construction shown in Fig. 1, provided with buttons $p p'$, and it is only necessary that the several fall-rope carriers should be provided with mechanism adapted for being operated upon by these several buttons, so as to place the same at intervals along the fall-rope as the same is paid out, in order to secure the requisite support for the fall-rope. One form of mechanism for this purpose is shown in Figs. 7 and 8 and another form in Fig. 9. I will first describe that form which is shown in Figs. 7 and 8. t is a dog pivoted at t' to the fall-rope carrier, and having its forked end held against the cable a by the spring t^2. This arrangement serves to clamp the cable between the extremity of the dog and the sheave-wheel l, as shown in Fig. 7. This dog is perforated at t^3 for the passage of the auxiliary rope m, and in front of this perforation a sheave-wheel t^4 is arranged for the auxiliary rope m to pass over. The relative size of the buttons and openings in the dogs is such that the button nearest the main carrier will pass through all the dogs in the series excepting the one nearest the main carriage. The next button will pass through all the dogs in the series until it comes to the second from the main carriage. The third button will pass through all the dogs in the series until it reaches the third one from the main carriage, and so on throughout the whole series. As soon as a button comes in contact with a dog having an opening too small for its passage it will carry that dog with it sufficiently to compress the spring t^2, disengage the extremity of the dog from the main cable, thus relieve the clamp, and permit the fall-rope carrier to move along the cable just as far as the button proceeds. As soon, however, as the button comes to rest, so as to relieve its pressure on the dog, the dog will again clamp the cable against the sheave-wheel l and cause the carrier to come to rest. Thus each carrier will come to rest at the point determined by the position of the button.

In lieu of the mechanism just described may be substituted the mechanism shown in Fig. 9. Here the carriage rests upon the cable at l', and is provided with an opening v, through which the rope m passes. The relative size of this opening and the buttons determine which button shall carry the carriage forward, the friction of the part l' upon the cable being sufficient to prevent the roller from running along the cable unless actuated by one of the buttons. A latch u is provided on the carrier, so that all buttons coming along may pass under the latch; but any button failing to pass through the opening v will be held between that opening and the latch. It will thus be seen that as the rope m travels in the direction of the arrow, Fig. 9, the several buttons will each push a carrier ahead of it, and wherever the button comes to rest there will the carrier come to rest also by reason of its friction on the cable. When the cable m returns in the direction opposite to the arrow, the latch u will compel the carrier to accompany the button back to the starting-point, where a stop w, acting upon the tail of the latch, will disengage it from the button and permit the button to proceed over the sheave-wheel r to the drum s. The stop w will serve to disengage the first latch of the series. The subsequent latches of the series will be disengaged by striking, respectively, against the preceding carriage, which thus performs the function of the stop w.

In operating the form of construction shown in Fig. 4, if the pulley-block f in the position shown in Fig. 4 have a load attached to it, the carriage may be compelled to travel up the incline without hauling the tackle-block f up to the carriage by winding in on both drums s and g simultaneously. Otherwise

before operating the drum *s* the tackle-block may be hauled up to the carriage *c* by operating the drum *g*, and then the carriage may be hauled up the incline by operating both drums simultaneously. The auxiliary rope *m* can be used to hold the carriage *c* in any place on the incline by merely stopping the drum *s* after the carriage has descended to the point desired, and then allowing the drum *g* to continue until the tackle-block *f* has descended to the point required to be reached.

I do not limit myself to mounting the stops by which the carriers are located on an auxiliary rope, since it is evident that they might be mounted upon the fall-rope itself or upon the cable or other support.

I claim—

1. In a hoisting and conveying apparatus, in combination, a cable, a carriage to travel thereon, a fall-rope, a fall-rope carrier, and a stop whereby said carrier is placed in position along the fall-rope, and means disconnected from said carrier for supporting said stop, substantially as described.

2. In a hoisting and conveying apparatus, in combination, a cable, a carriage to travel thereon, a fall-rope, a series of fall-rope carriers, and a series of stops and means for supporting the same, each of said stops being adapted to engage one of the fall-rope carriers and to pass by the others, substantially as described.

3. In a hoisting and conveying apparatus, in combination, a cable, a carriage to travel thereon, a fall-rope, an auxiliary rope secured at one end to the carriage and at the other end to a winding-drum, substantially as described, whereby the carriage may be held in any required position on the cable by the auxiliary rope while the fall-rope is in operation, substantially as described.

4. In a hoisting and conveying apparatus, in combination, a cable, a carriage to travel thereon, a fall-rope, a series of fall-rope carriers provided with openings of various sizes, and a series of buttons of varying diameters and means for supporting the same, substantially as described.

5. In a hoisting and conveying apparatus, in combination, a cable, a carriage to travel thereon, a fall-rope, a series of fall-rope carriers mounted upon the cable and provided with a series of openings of gradually-increasing diameter from one end of the series to another, and a series of buttons arranged in line with said opening and of gradually-increasing diameter from one end of the series to the other, and means for supporting the same, substantially as described.

6. In a hoisting and conveying apparatus, in combination, a cable, a carriage to travel thereon, a series of fall-rope carriers provided with a series of openings, a rope disconnected from said carriers, passing through said series of openings and provided with a series of stops, each one of which stops is adapted to engage with one of the fall-rope carriers in passing, substantially as described.

7. In a hoisting and conveying apparatus, in combination with a series of stops and means for supporting the same adjacent to the fall-rope, a series of fall-rope carriers, each one of which is provided with a perforated dog adapted to bear against the cable, and a spring for actuating said dog, substantially as described.

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Witnesses:
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